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Establishing a Fit for Duty Program for Winchester Fire-EMS

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CERTIFICATION STATEMENT

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

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Abstract

Fire departments spend millions of dollars and expend countless hours purchasing, maintaining, and training on apparatus and equipment. The most important component of any fire department is the men and women who serve as firefighters. The problem is Winchester Fire-EMS (WFEMS) does not have established guidelines for maintaining minimum levels of fitness for duty. As a result, the overall fitness of the department has deteriorated, creating lower service levels to the community, increased danger to fellow workers, and increased personal risk to the individual firefighter. The purpose of this research is to improve the fitness of the firefighters, thus enhancing the service levels to our community and lowering the risks of firefighter injuries and fatalities. The descriptive research method was used to answer the following research questions:

1. What would be the effects of implementing fit for duty guidelines at WFEMS?
2. How should acceptable levels of fitness be determined for firefighters at WFEMS?
3. Which components of a fitness program would best benefit the firefighters at WFEMS?
4. What have been the experiences of other organizations implementing fit for duty guidelines?

The research was conducted through a literature review of various physical fitness resources, a survey instrument of members of WFEMS about physical fitness, and a survey of other Kentucky fire departments' ideas about fitness. Data analysis of previous fitness assessments portrayed the average firefighter fitness level at WFEMS. The results indicated that a Fit for Duty Program may help reduce firefighter risks and improve the physical fitness of WFEMS to help provide better service to our community. A Fit for Duty Program was designed and recommended to the Fire Chief for implementation.

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Fire departments spend millions of dollars and expend countless hours purchasing, maintaining, and training on apparatus and equipment. Yet departments allocate a fraction of those same assets to support the wellness and fitness of their most valuable resource-firefighters. Firefighters typically perform physically demanding and stress-filled tasks in hazardous environments for extended periods of time without the benefit of nutrition and sleep. To enable firefighters to continuously function at this level of performance, without posing a risk to themselves or others, requires a system to frequently monitor and maintain personnel health and fitness.

Wellness is a commitment all firefighters must make to survive their job. When firefighters are sick, injured, malnourished, overweight, or overstressed, it affects their ability to do their job (IAFF, 2008). Across the nation, fire departments are making fitness and health a top priority. Maximum physical strengths and endurance are often required for firefighters to carry out their tasks on an emergency scene. Given the physical demands and unpredictability of the job, a firefighter's body has to be ready at a moment's notice for every possible situation.

The most important component of any fire department is the men and women who serve as firefighters. The problem is Winchester Fire-EMS (WFEMS) does not have established guidelines for maintaining minimum levels of fitness for duty beyond entry-level requirements. As a result, the overall fitness of the department has deteriorated, creating lower service levels to the community, increased danger to fellow workers, and increased personal risk to the individual firefighter. The purpose of this research is to enhance the wellness and fitness of the firefighters, thus improving the service levels to our community and lowering the risks of firefighter injuries

and fatalities. The descriptive research method was used to design and implement a Fit for Duty Program by answering the following research questions:

5. What would be the effects of implementing fit for duty guidelines at WFEMS?
6. How should acceptable levels of fitness be determined for firefighters at WFEMS?
7. Which components of a fitness program would best benefit the firefighters at WFEMS?
8. What have been the experiences of other organizations implementing fit for duty guidelines?

Background and Significance

Winchester Fire-EMS is a small department providing fire suppression, advanced life support emergency medical services, fire prevention, public education, building inspections, hazardous materials operations, and an array of community outreach programs to the citizens of Winchester and Clark County in Kentucky. The combined population is approximately 51,000 people. The department has a coverage area of eight square miles in the city and 254 square miles in the county. The department is comprised of 55 career personnel cross-trained in firefighting and emergency medical care. Each platoon consists of a Battalion Chief, three Lieutenants, and 13 Firefighter/EMT/Paramedics. The platoons work a 24-hour on and 48-hour off rotation. The staff, consisting of a Fire Chief, Fire Marshal, Training Officer, and EMS Officer, work a 40-hour week. All personnel are expected to fully participate in any hazard mitigation. WFEMS has three stations, each housing an Engine Company and an Emergency Care Unit. A Lieutenant and two firefighter/EMTs make up the Engine Company and a paramedic/firefighter and a firefighter/EMT are on the emergency care unit. The department has an engine, a ladder truck, a rescue truck, and three emergency care units in reserve status. Along with providing fire and EMS services, the department does public education, inspections, investigations special rescue,

and hazardous materials. WFEMS also belongs to the Bluegrass Emergency Response Team. At WFEMS the average firefighter age is 35 years old, the majority having less than eight years of experience. Each fire station is equipped with a treadmill, a recumbent bike, and a selection of free weights. Currently the department does not have a standard operating procedure (SOP) that addresses wellness/fitness training.

Since the mid-1990s, WFEMS has tried to implement some form of a fitness program. In the beginning, a task-oriented course, completed in regular uniforms, was timed. The end result was a competition with no feedback provided. A couple years later, bulky protective gear and a self-contained breathing apparatus (SCBA) were added. Initially it required completion of course within the one cylinder of air. Again, this resulted in a race for best time and least amount of air used, with no feedback. After several firefighters were not able to complete the test due to injuries or other medical reasons, the department decided that a medical examination should precede the physical test. The medical examination began simply as a routine exam then developed into the annual examination, guidelines set forth in *NFPA 1582, Standard on Comprehensive Occupational Medical Program for Firefighters* (NFPA, 2007). Regular fire and EMS training, combined with emergency runs, fire calls, building inspections, and routine inter-facility transfers, took priority over physical fitness training or evaluations. The department developed the attitude of "just being too busy for p.t." Within the last four years, the department has re-established physical fitness evaluations as a priority. The department conducted medical examinations in the early spring, and then had some form of physical fitness assessment in the late fall. Throughout the years, the department has not had a formal program or standard operating procedure for this process. This deficiency is the basis for this Applied Research Project.

WFEMS has highly trained firefighters with state-of-the-art equipment capable of performing all types of services. These services will be useless unless the firefighters can perform at optimal levels during an emergency. The significance of this project is to develop a program that improves the quality of, and will constantly monitor and measure, the physical fitness of each WFEMS employee. This program will assist WFEMS firefighters toward a more health conscious attitude, in turn providing better services for the community.

This research relates to one or more of the United States Fire Administration (USFA) Operational Objectives. It attempts "to appropriately respond in a timely manner to emergent issues" and "to reduce the loss of life of firefighters" (USFA, 2005), both of which will affect firefighters and safe operations by instilling a culture of wellness into the department. This research project stems from participation in the National Fire Academy's Executive Fire Officer Program, specifically dealing with course concepts from Executive Leadership. Participants are taught to continually evaluate and analyze their department in an attempt to meet ever-changing needs and to continually strive to improve the effectiveness of their department. In an effort to align this ARP with the Executive Leadership course, one needs only to look at the course goal which states, "The chief fire executive will develop the ability to conceptualize and employ the key processes used by effective executive-level managers" (Executive Leadership, 2005). Implementing a physical fitness program will require "influencing", "negotiation", "persuasion", as well as "judicious use of power", all topics studied in the Executive Leadership course.

Literature Review

Research was conducted at the Learning Research Center at the National Fire Academy. In an effort to gain as much information as possible, all types of sources were reviewed including fire

service magazines and journals, books, Executive Fire Officer research papers, and emergency management periodicals. These sources were reviewed in an effort to find any resources on fitness programs and physical fitness assessment. Further research was conducted on NFPA standards in the WFEMS library and by accessing online information from the National Volunteer Fire Council, the International Association of Firefighters (IAFF), the International Association of Fire Chiefs (IAFC), and the National Fallen Firefighters Foundation. Internet sources were searched using “firefighter”, “physical fitness”, and “fitness programs” as key words.

Firefighters have to perform many tasks including advancing hose lines, lifting and climbing ladders, carrying and using heavy equipment, and removing victims from danger. Firefighters perform these tasks while wearing bulky protective gear and SCBA, making the job more difficult. Due to this difficulty, a firefighter needs to be in better physical condition than the average person.

The American population is becoming increasingly obese and unhealthy due to lack of physical exercise in their daily lives. These unhealthy habits are becoming the number one preventable cause of death (Tanner, 2004). Heart- and stress-related diseases are a national problem. People – firefighters, corporate executives, blue collar workers, even doctors – will continue to die needlessly from preventable health problems (Wilmoth, 2003). Approximately 100 firefighters die in the line of duty each year. Approximately 50% of these deaths are from stress-related heart attacks, at the average age of 44 (USFA, 2007). The fire service needs to mirror the general population in addressing workplace fitness and wellness. At the 2002 American College of Sports Medicine (ACSM) meeting, Dr. Michael Fragen explained how the injury rate in firefighting is four to five times greater than in other occupations. He further

suggests there needs to be department fitness programs implemented to help combat this preventable risk factor in the fire service (ASCM, 2002). Due to the dynamic physical stresses of the fire service, responding emergency personnel are 60 times more likely to suffer a cardiac event compared to the general public. Studies have shown that firefighting requires working at near-maximum heart rates for prolonged periods of time (Hayford, Pearson, & Royer, 1995). Fire suppression provides a sudden and sustained cardiovascular challenge that requires intermittent bursts of muscular strength and endurance which places even more of a workload on the heart. Bulky protective gear, SCBA, and extreme environmental conditions intensify the physiological demands placing personnel at a greater risk of experiencing a cardiovascular event. There is a direct correlation between added body weight and decreased physical performance. As body weight increases with firefighting gear, efficiency decreases and fatigue sets in faster. Due to up to 75 pounds of gear, firefighters who do any work on the fire ground are already one-third less efficient than if they were not wearing any gear at all. Although firefighting and rescue operations demand strenuous physical exertion from time to time, many of the duties of firefighters can be characterized as sedentary in nature (i.e. building inspection, public education, and equipment maintenance). The combination of these two extremes in physical activity is responsible for a significant number of on-the-job injuries and illnesses. Additionally, nearly half of disabling injuries can be attributed to a lack of physical fitness. Peate, Lunderan, and Johnson (2002), showed that inactive firefighters have a 90% greater risk of myocardial infarction than those who are aerobically fit. The fire service is beginning to recognize and admit the problems associated with a less than fit service. The National Fire Protection Association (NFPA) acknowledged this fact by stating, “overweight, out-of-shape firefighters are an accident waiting to happen” (NFPA, 2008). Because of the critical job demands of firefighting and the negative

consequences of inadequate fitness, periodic aerobic capacity testing with individualized exercise prescriptions and work-community support may be advisable for all active-duty firefighters. A study at the Applied Exercise Science Laboratory at Texas A&M University by Wade Womack investigated a firefighter's risk of suffering a heart attack. The study followed 74 firefighters ages 20–60 years old over a 6-year period and concluded that firefighters have long periods of stress-free activity during the day. When the call for help comes, a sudden demand for intense energy is required. If the firefighter is not in adequate physical condition, the results can be deadly (Womack, 2001).

The U.S. Fire Administration (USFA) reports that over 75,000 firefighters have been injured every year since 1997 (USFA, 2007). The severity of these injuries range from minor aches and pains to debilitating injuries, which render a firefighter unable to work in any field. It is not uncommon for firefighters to complete weeks or even months of rehabilitation before returning to work. The National Institute of Standards and Technology (NIST) recognize the cost and economic impact of firefighter injuries. The report details the cost related to firefighter injuries and explores the many reasons for injuries within the fire service (NIST, 2004). The report further describes the lack of fitness programs by many fire departments, but does go on to outline the positive impact made by departments that have chosen to implement and promote fitness programs. Many other positive, but not always measurable, benefits will result from a healthier workforce including increased worker productivity, lower absenteeism and sick day usage, better work quality, improved employee morale, and improved employee recruitment and retention (Rombel, 2004). Jones (2005) agrees that the fire service is becoming increasingly tolerant of an unfit workforce and this attitude must change. He further adds that fire service leaders do not place enough importance on fitness training. Fitness training does not have the

same priority level as other issues within the fire service. On the fire scene, physical fitness plays a critical role. Without this basic building block nothing gets done, technology helps to some extent, but it's still the physical effort that gets the job done expeditiously (Davis, 1994).

Health and medical issues have become increasingly important to the fire service. Firefighters know all to well how the medical and physiological demands of firefighting have changed. Personal protection equipment has improved as firefighters encounter "super bugs" in the community and as physical and mental requirements for being a firefighter have increased (Pratt, 2004). Physical fitness of firefighters has a direct impact on their ability to handle the physical and mental capabilities of the job; therefore, fire departments should have a physical fitness standard in which those standards, the assessment process, and the consequences of failing to meet those standards are clearly defined (O'Conner, 1996).

Taking a proactive stance on firefighter physical fitness requires developing minimum fitness standards and ensuring that firefighters have a program in place to support them in meeting those standards. In 2004, the National Line of Duty Death Summit developed "16 Firefighter Life Safety Initiatives"; three of those initiatives addressed health and wellness (NFFF, 2004). All of this data demonstrates that the American fire service recognizes a need for minimum fitness standards. In 1987, The National Fire Protection Association (NFPA) developed a standard for occupational health and safety, NFPA 1500, *Standard on Fire Department Occupational Safety and Health Programs* that specifically addresses wellness fitness programs for firefighters. NFPA 1500 added fitness for duty evaluations to their 2007 edition (NFPA, 2007). The National Volunteer Fire Council (NVFC) conducted a study, in conjunction with the USFA and the American Heart Association, and found that physical activity is one of the best ways to help prevent and control coronary heart disease (NVFC, 2005).

Fire departments are made up of many different body types and sizes, along with many different levels of conditioning and work capacity. It is a rare individual who becomes more fit once on the job, let alone maintains a reasonable level of fitness until retirement. The benefits of exercise certainly outweigh the risks of not being fit. Here are just a few of the many proven benefits of a fitness program:

- reduces the risk of heart disease by improving circulation throughout the body
- keeps weight under control
- improves blood cholesterol levels
- prevents and reduces high blood pressure
- prevents bone loss
- strengthens muscles, joints, tendons, and ligaments
- boosts energy levels and improves endurance
- helps manages stress
- improves sexual function and better sex life
- improves the ability to fall asleep and sleep well
- improves mental sharpness
- slows the effects of aging
- increases self-esteem

Age, injury accumulation, heredity, and lifestyle take their toll, especially in the fire service as we face unpredictable and extraordinary physical demands under very stressful conditions (Perry, 2008). Physical fitness is defined as the ability to perform work and leisure activities effectively and efficiently, to be healthy, resist disease, and the ability to perform emergency activities if necessary (Wikipedia, 2008). Firefighters must possess certain traits, such as

muscular strength, muscular endurance, flexibility, cardiovascular conditioning, and healthy body composition (Lim, 2006). For exercise to be effective and therapeutic, it must be prescribed in doses according to the needs of the individual.

Non-fire service health and fitness organizations provide recommendations for fitness measures to be included in programs. American Council on Exercise (ACE) suggests any wellness program include the following components: heart rate and blood pressure, body composition, cardio respiratory fitness, muscular strength, muscular endurance, and flexibility (ACE, 2003). The American College of Sports Medicine (ACSM) recommends programs include a medical history, physical exam, lab tests, body composition, cardio respiratory fitness test, muscular strength and endurance test, and flexibility tests (ACSM, 2006). Physical fitness programs and physical fitness testing help evaluate the firefighter's level of fitness, giving them the advantage of knowing their strengths and weaknesses in their ability to do their job.

In addition to standard 1500, NFPA adopted 1582, *Standard on Comprehensive Medical Programs for Fire Departments,* and 1583, *Standard on Health-Related Fitness Programs for Fire Fighters.* One important fact noted in NFPA 1582 is that it does not differentiate between volunteer, paid-on-call, or career firefighters because tasks in the fire service are all the same. NFPA 1582 (2007) recommends that the medical evaluation should be done prior to training programs and also any emergency response activities. NFPA 1583 provides more explicit explanations and advice for achieving and maintaining firefighter fitness. The fitness components listed in NFPA 1583 include: aerobic capacity, body composition, muscular strength, muscular endurance, and flexibility. The health-related components focus on the importance of fitness, creating lifestyle changes, and enhancing job performance (NFPA, 2008). Additionally, the standard provides direction on the Health/Fitness Coordinator whose duties would include

overseeing the program and conducting physical fitness assessments. The three NFPA standards, when used together, provide detailed direction for the development and implementation of a physical fitness program and an evaluation process for firefighters.

The International Association of Fire Chiefs (IAFC) and the International Association of Fire Fighters (IAFF), in an attempt to improve the quality of life for firefighters, initiated the "Fire Service Joint Labor Management Wellness-Fitness Initiative." The purpose of this initiative was to institute a positive perception on health and physical fitness in the fire service. IAFC/IAFF suggests developing a holistic wellness approach that includes: annual fitness assessments and physical agility testing, annual medical examinations, rehabilitation, and behavioral health components. Wellness is a commitment to the uniformed personnel's quality of life; when they come to work, respond to calls, go home at the end of their shifts, and retire at the end of their career (IAFF, 2008).

Maintaining a firefighter's fitness levels should be as much a part of running a department as sending rigs in for repair and ensuring SCBA function properly (Ellis, 2007). One common thread that binds all successful fitness programs is support from top management. The key ingredient for a successful program is the Chief's desire to make it happen (Davis, 1991). He further indicates that fitness programs should be viewed as employee assistance aimed at general health, well-being, and injury prevention. Pearson (1994) makes the case for fitness training by stating that the real benefit of a program is not to ensure that the firefighters have the requirements to physically perform job functions, but to improve performance, reduce deaths, injuries, occupational illness, and disabilities. Pearson further states, "to have the greatest benefit, the program has to target members who are the least fit and motivated, no matter who they are. These people have the most to gain, personally and professionally, from even small

improvements in fitness and health" (Pearson, 1994). Regardless of the department's size, key players should include the Fire Chief. If there is no buy-in from the top, the chances for a successful program are very limited (Perry, 2002).

Summary

The literature review provided insight concerning the importance of physical fitness programs from a health viewpoint to firefighter performance at an emergency scene. "Fire departments provide firefighters with the necessary gear to fight fire; they provide protective clothing, fire hose and apparatus. They spend hundreds of thousands of dollars on this gear, but as a whole the fire service has never spent money on physical fitness that is necessary for the firefighter to complete their job" (Landry, 2007). Leaders of each department are responsible for the safety and well being of their personnel. Changing individual behavior, fire department culture, and the nation's attitude about the vital importance of wellness and fitness programs must become the forefront of concern for all members and departments.

Procedures

The initial research began in the Executive Leadership class at the National Fire Academy from May 19-30, 2008. Different issues affecting the fire service were discussed throughout the class sessions. A lack of physical fitness programs were a widespread concern throughout the class members. The purpose of this research is to improve the wellness and fitness of firefighters, thus enhancing the service levels to the community and lowering risks of firefighter injuries and fatalities. The descriptive research method, using a combination of literature review, survey instruments, and statistics and characteristics from WFEMS, answered the following research questions:

1. What would be the effects of implementing fit for duty guidelines at WFEMS?

2. How should acceptable levels of fitness be determined for firefighters at WFEMS?
3. Which components of a fitness program would best benefit the firefighters at WFEMS?
4. What have been the experiences of other organizations implementing fit for duty guidelines?

The research began by investigating the problem and gathering information from the Learning Resource Center at the National Fire Academy. Keywords and phrases such as “firefighter physical fitness”, “fitness programs”, and “physical fitness standards” discovered numerous documents from various sources. Additional searches of the WFEMS library and online search engines were conducted over several months to locate additional academic material.

Fitness assessments from WFEMS for the last three years were organized for review and comparison of the “average person” from various fitness programs. Since no medical information subject to privacy laws was utilized, information release forms were not necessary. The results from each of the last three years were totaled and averaged for that year. The new yearly averages were totaled and averaged to represent the “average” firefighter at WFEMS. The fitness assessment components used consisted of: age, BMI, push-ups within one minute, crunches within one minute, sit/reach measured in inches, and one mile walk time. The average firefighter was then scored using fitness scores from various programs.

A survey was developed to gather information about internal attitudes concerning physical fitness of all WFEMS employees. (Appendix A) The survey was distributed over three platoon days in order to contact all employees. All fifty-five employees completed and returned the survey. The goal of the survey was to gather a variety of information regarding attitudes and general knowledge of physical fitness. The survey also sought responses of each member's

perceived level of fitness, current methods of fitness training, and allowed the members to provide additional comments about physical fitness.

A survey of Fire Chiefs (Appendix B) focused on the experiences and attitudes of other departments that are currently implementing a physical fitness program. A cover letter, survey, and a return self-addressed stamped envelope were mailed to 50 fire departments across the Commonwealth of Kentucky. The cover letter (Appendix C) was an introduction of the researcher and explanation of the purpose of the survey. The National Directory of Fire Chiefs and EMS Administrators (2006) provided the information for the mailing list of the 50 fire departments. (Appendix D)

Assumptions and Limitations

It was assumed that all respondents of both survey instruments understood each question and answered truthfully. The firefighter survey had a limitation of the person's self-assessment; that is how many people will accurately reveal their current health condition. The limitations of the Fire Chiefs survey were not getting copies of fitness programs or standards returned to the researcher.

Definition of Terms

- International Association of Fire Chiefs – an organization that represents the interest of chief officers of the fire service.
- International Association of Fire Fighters – a labor organization that represents over 300,000 career firefighters.
- National Fire Protection Association – a conscientious organization that represents a multitude of organizations directly related to fire prevention and suppression.

- Body mass index (BMI) – a standard that determines the degree of body fat. The number is determined by dividing the individual weight in kilograms by the individual's height in meters squared. The percentages are then categorized into below average, average, and obese.
- Body composition – the ratio of the body's lean and fat tissues.
- Flexibility – the ability to move the joints of the body through their normal range of motion.
- Muscular strength – the amount of weight that can be pulled or pushed.
- Muscular endurance – the ability of the muscle or group of muscles to generate force without fatigue.
- Cardiovascular – the ability to participate in sustained vigorous activity for long periods of time.

Results

Research Question #1

What would be the effects of implementing fit for duty guidelines at WFEMS?

Research and data collected for this project indicated that a fitness program would greatly benefit firefighters at WFEMS. The research gathered indicated that the demands and stressors of the job require a firefighter to be in the fitness range equal to that of a professional athlete. A review of literature and publications indicated that being in good physical condition reduces on-the-job injuries and lost time from work. Several NFPA standards that recommend physical fitness programs and fitness assessments for firefighters were found. While the standards are not laws, they are a consensus of fire service professionals and are subject to legal interpretation. A properly validated physical fitness assessment is necessary for safe, efficient, and reliable

performance of the job. Key organizations such as IAFC, IAFF, and NVFC have published programs to assist departments in implementing fitness programs.

Research Question #2

How should acceptable levels of fitness be determined for firefighters at WFEMS?

Fitness assessment results from WFEMS for the last three years were organized for review and comparison of the "average person" from various fitness programs. Since no medical information subject to privacy laws was utilized, information release forms were not necessary. The results from each of the last three years were totaled and averaged for that year.

Year	**Age**	**BMI**	**Push-ups**	**Crunches**	**Sit/Reach**	**1 Mile Walk**
2005	34	31	22	26	14.5	15:55
2006	35	30	30	35	16	15:32
2007	35	30	32	34	16	14:27
Averages	**35**	**30**	**28**	**32**	**15.5**	**15:05**

The new yearly averages were totaled and averaged to represent the "average" firefighter at WFEMS. The fitness assessment components used consisted of: age, BMI, push-ups, crunches in one minute, sit/reach, and one mile walk time. The data from the average firefighter was then scored using fitness scores from various programs. The fitness comparison document was developed three years ago from various books and Internet sources. (Appendix E) Using the average age of 35, the WFEMS results are listed below:

Push-ups	30-39 year old	22-29	good
Crunches	30-39 year old	28-35	poor
Sit/Reach	30-39 year old	14-16	good
1 mile walk	under 40	13:01-15:30	good

Research Question #3

Which components of a fitness program would best benefit the firefighters at WFEMS?

A survey was given to all WFEMS employees. All fifty-five employees completed and returned the survey. The goal of the survey was to gather a variety of information regarding attitudes and general knowledge of physical fitness. The survey also sought responses of each member's perceived level of fitness, current methods of fitness training, and allowed the members to provide additional comments about physical fitness. The following survey questions were answered:

1. Are all of the firefighters at WF-EMS physically fit enough to perform their duties?

YES - **10 / (18%)** NO - **45 / (82%)**

The majority of the department felt that their fellow firefighters were fit enough to do the job.

2. Do you think being physically fit is an important consideration for firefighters to perform their duties? YES - **55 / (100%)** NO - **0**

All members agreed upon the importance of physical fitness.

3. Do you think a fitness program could reduce work related injuries, illnesses, or discover other hidden medical conditions for members of our department?

YES - **51 / (93%)** NO - **4 / (7%)**

Over the past three years, firefighters have seen different hidden conditions discovered during assessments. Members have made comments about sick day usage decreasing since they have started working out more while on duty.

4. Are you satisfied with your current level of fitness?

YES - **24 / (44%)** NO - **31 / (56%)**

Limitation of self-perception on fitness. No one is ever satisfied with his or her current level.

5. What activities do you prefer when you do fitness training? (Circle all that apply)

cardio training - **41** *muscle strength* - **32**

muscle endurance - **23** *stretching/flexibility* - **26**

Cardio training and strength training are usually done in a rotation pattern, cardio training one day, muscle training the next. This could account for the higher numbers in these responses.

6. Is the fitness equipment in your station adequate to satisfy your physical training?

YES - **25 / (45%)** NO - **30 / (55%)**

Some equipment has become worn out and needs replacing. A station is restricted on the amount of space provided for fitness equipment

7. Would a trained fitness specialist assigned to each shift make the program more effective?

YES - **21 / (37%)** NO - **34 / (63%)**

Several comments were made about the benefits of individualized training utilizing an on-duty fitness specialist.

8. Do you think time should be scheduled into your shift day for fitness training?

YES - **47 / (85%)** NO - **8 / (15%)**

The majority of the members felt fitness training should be scheduled into the day, just like checking apparatus each morning.

9. Should physical fitness training be mandatory in order to effective?

YES - **21 / (37%)** NO - **34 / (63%)**

Most members believed if the fitness training could be scheduled into the day, peer pressure would motivate the reluctant individuals. The firefighters had concerns regarding if fitness was made mandatory, then punitive measures would be implemented for non-participation.

10. Should a yearly physical fitness assessment be mandatory for all uniformed personnel?

YES - **41 / (75%)** NO - **14 / (25%)**

Most members referenced the need for an assessment in order to determine their areas of strengths and weaknesses.

11. What components should be included in a physical fitness program? (Circle all that apply)

cardio training - **41** *muscle strength* - **32**

muscle endurance - **23** *flexibility* - **26**

PT specialist at each station - **12** *physical fitness assessments* - **20**

Many favorable comments were made in regard to the department using the IAFC/IAFF Wellness Fitness Initiative and NFPA 1583 in order to implement a fitness program.

Research Question #4

What have been the experiences of other organizations implementing fit for duty guidelines?

A survey of Fire Chiefs focused on the experiences and attitudes of other departments implementing a physical fitness program. A cover letter, survey, and a return self-addressed stamped envelope were mailed to 50 fire departments across the Commonwealth of Kentucky, 38 departments returned the survey. The following research questions were answered:

1. Does your department conduct annual medical exams for personnel?

YES - **32 / (84%)** NO - **6 / (16%)**

Many of the departments reported that they had just recently started medical physicals; most within the last three years.

2. Does your department have a Physical Fitness Program?

YES - **22 / (58%)** NO - **16 / (42%)**

As with the medical exams, fitness programs had just been started within the last three years.

3. Does your department have a written SOP/SOG for your Physical Fitness program?

YES - **13 / (34%)** NO - **25 / (66%)**

(If yes, please include a copy in your returns)

Departments reported that they had not yet put their Physical Fitness program on paper or were in the process of doing so. No copies of programs were returned to the researcher.

4. Does your department conduct annual physical fitness assessments?

YES - **15 / (39%)** NO - **23 / (61%)**

Some of the departments reported conducting variations of the Firefighter's Combat Challenge.

5. Does your department have a minimum fitness standard for firefighters?

YES - **13 / (34%)** NO - **25 / (66%)**

(If yes, please include a copy in your returns)

Even though 66% answered yes to a minimum standard, no one returned copies of these standards.

6. Does your department have physical fitness training on duty?

YES - **31 / (82%)** NO - **7 / (18%)**

The majority of the departments reported having fitness equipment and allowing firefighters to voluntarily workout while on duty.

7. What are the components of your program? (circle all that apply)

aerobic capacity - **25** *muscular strength* - **25** *flexibility* - **23**

muscular endurance - **25** *body composition* - **9** *other* - **0**

No comments were returned for this question.

8. Are you familiar with NFPA 1583 - Standard on Health-Related Fitness Programs for Firefighters and/or IAFC/IAFF Wellness Fitness Initiative?

YES - **36 / (95%)** NO - **2 / (5%)**

The majority reported these two documents were the resources they were using to implement their programs.

9. A Physical Fitness Program with a goal of improving firefighter's fitness and helping reduce work related injuries is extremely important.

Agree - **37 / (97%)** Disagree - **1 / (3%)**

No comments were returned for this question.

Discussion

After a review of the literature, the researcher recognizes there are national standards that outline the appropriate procedures for a fitness program. The researcher also recognizes that sudden cardiac death is the leading cause of firefighter fatalities. As cardiovascular disease and sudden cardiac death remain the top firefighter killers, it is encouraging to see the leading organizations, IAFC, IAFF, NVHC, and NFPA have worked together for the benefit of all firefighters. This collaborative effort cannot be understated. By providing all fire personnel a clear-cut path to identify, evaluate, and mitigate health and fitness problems, the fire service is taking a pro-active approach to significantly decreasing the number of firefighters who die needlessly from cardiovascular events. Even knowing that heart attacks are the primary cause of fatalities, it has failed to motivate firefighters to do more for themselves. Knowing the statistic is one thing, but convincing a diverse and fiercely independent fire service to change for the sake of health is quite another.

A firefighter can be healthy, but not fit enough to perform the job; the distinction between the two is measurable (Davis, 1996). It is imperative for firefighters to be in good physical condition in order to operate safely at an emergency scene. Firefighters need muscular strength and cardio endurance to meet the demands of firefighting. An exercise program ranging from thirty minutes to one hour per shift can vastly improve firefighter fitness. The literature review and the survey results indicate that a program combining body composition, muscular strength, cardio endurance, and muscular endurance and flexibility will best benefit the overall fitness of firefighters.

The survey results also indicate that the fitness program should take a multidimensional approach. The programs must include a medical exam by a physician, periodic fitness assessments, and individual exercise plans in order to maximize the numerous benefits of exercise. As mentioned in the literature review, the benefits of exercise are immense and continue to grow rapidly. In addition to the numerous individual exercise benefits, fire departments will be rewarded with lower sick day usage, decreased overtime costs due to covering an injured firefighter, and lower worker's compensation expenses (Walterhouse, 1996).

Considering that currently no formal program exists at WFEMS, the researcher was pleased with the overall results of the average of the last three-year fitness comparison to the average adult. Of the four components compared, the average firefighter scored "good" in three of the four areas. Realizing there is always room for improvement, the results indicate a definite need in core strength and flexibility. After the extensive literature review, the researcher realized that implementing a minimum fitness level is very controversial throughout the fire service. All organizations strive for the goal of maintaining and continual improvement of fitness. Minimum

fitness levels could be perceived as punitive and could negatively affect the success of a fitness program.

The majority of WFEMS members deemed the need of a fitness program highly important. Literature review indicates the attitude and involvement of personnel, including support from top management, greatly influences the success or failure of the program. With this high priority status, the researcher believes that WFEMS members generally have a positive attitude toward fitness and the department is ready to embrace a new fitness program.

As stated in NFPA 1583 (2008), firefighters need to be physically and medically fit in order to perform vital job functions. The challenge of a fire service is to engage personnel in making a personal commitment to wellness. Firefighters need to keep exercising in order to maintain good performance levels throughout their career by working physically smart and recognizing their limitations (Ball, 2003). Because firefighters don't have the luxury of picking and choosing the times when they are useful in this business, firefighters must be physically ready for just about anything (Ellis, 2008). Firefighters owe it to themselves, their families, their fellow firefighters, and the taxpayers to whom they are sworn to serve to achieve and maintain the highest fitness level possible. Additionally, it is a great reflection on the department for the public to see their local firefighters dedicated to maintaining their fitness levels to better serve the community.

Annual firefighter injury and fatality reports clearly portray minimal to no measurable progress in lowering these numbers. In the end, a positive cultural shift and each person accepting individual responsibility for his or her own health and fitness are key ingredients to the solution (Perry, 2008). The findings in this Applied Research Project conclusively indicates that

WFEMS should design and implement a Fit for Duty Program to help reduce deaths and injuries and to better the wellness of firefighters, thus improving the service levels to our community.

Recommendations

Various organizations have developed guidelines for fitness programs for the fire service and are supported by management and labor groups within the fire service. The need to provide a fit fire service is vital both to customers and fire service members. The priority of fitness should equal the importance of any other fire service training or maintenance. Based on the research findings the following recommendations are made:

- The development of a standard operating procedure (SOP) to address the key components of a fitness program.
- The implementation of peer fitness trainers to assist with wellness/fitness training.
- The implementation of a physical fitness assessment to monitor the individual's level of fitness.
- To allot at least one hour per duty day for members to participate in physical fitness.
- The commitment from management and labor to fully support physical fitness as a priority of the department.
- The addition of a budget account for wellness/fitness components.

WFEMS should design and implement a Fit for Duty Program for all members of the department. A copy of this applied research project and a draft proposal of a fitness program (Appendix F) will be submitted to the Fire Chief and City Manager for approval.

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Appendix A

Winchester Fire-EMS Physical Fitness Survey

Below is a survey on Physical Fitness Programs. This survey will be used as part of an applied research project for the Executive Leadership course of the Executive Fire Officer Program. Please answer the questions and return them to me by **October 24, 2008**. Thank you in advance for helping me with my project.

1. Are all of the firefighters at WF-EMS physically fit enough to perform their duties?

YES NO

2. Do you think being physically fit is an important consideration for firefighters to perform their duties?

YES NO

3. Do you think a fitness program could reduce work related injuries, illnesses, or discover other hidden medical conditions for members of our department? YES NO

4. Are you satisfied with your current level of fitness?

YES NO

5. What activities do you prefer when you do fitness training? (Circle all that apply)

cardio training muscle strength

muscle endurance stretching/flexibility

6. Is the fitness equipment in your station adequate to satisfy your physical training?

YES NO

7. Would a trained fitness specialist assigned to each shift make the program more effective?

YES NO

8. Do you think time should be scheduled into your shift day for fitness training?

YES NO

9. Should physical fitness training be mandatory in order to effective?

YES NO

10. Should a yearly physical fitness assessment be mandatory for all uniformed personnel?

YES NO

11. What components should be included in a physical fitness program? (Circle all that apply)

cardio training muscle strength

muscle endurance flexibility

PT specialist at each station Physical fitness assessments

Comments: _____

Appendix B

FIRE CHIEF SURVEY

This survey is being conducted for a research project for the Executive Leadership course of the Executive Fire Officer Program at the National Fire Academy. This research project is being conducted by Cathy Rigney, Battalion Chief of Winchester Fire-EMS. Please complete by you or a member of your staff, and return in the provided envelope by **October 31, 2008**. Thank you for your help.

Name of Department:_____

Number of personnel in your department: _____

1. Does your department conduct annual medical exams for personnel?
YES NO

2. Does your department have a Physical Fitness Program?
YES NO

3. Does your department have a written SOP/SOG for your Physical Fitness program?
YES NO
(If yes, please include a copy in your returns)

4. Does your department conduct annual physical fitness assessments?
YES NO

5. Does your department have a minimum fitness standard for firefighters?
YES NO
(If yes, please include a copy in your returns)

6. Does your department have physical fitness training on duty?
YES NO

7. What are the components of your program? (circle all that apply)

Aerobic Capacity	Muscular Strength	Flexibility
Muscular Endurance	Body Composition	Other: _____

8. Are you familiar with NFPA 1583 - Standard on Health-Related Fitness Programs for Firefighters and/or IAFC/IAFF Wellness Fitness Initiative?
YES NO

9. A Physical Fitness Program with a goal of improving firefighter's fitness and helping reduce work related injuries is extremely important.
Agree Neutral Disagree

Comments:_____

Thank you for your participation.

Appendix C

Dear Chief:

Please allow me to introduce myself. My name is Cathy Rigney and I'm a Battalion Chief with Winchester Fire-EMS. I am enrolled in the Executive Fire Officer Program at the National Fire Academy, which is a four-year program for developing Chief Officers. After each class we are required to write a research paper. This is where I need your help. I am doing research on developing a Health Related Physical Fitness Program. This packet is being sent to 50 departments across the state and I have included a survey that I am asking you or a member of your staff to complete and return to me by ***October 31, 2008***. I apologize for the time frame, but I have a time restriction on my research paper.

The research results could mean the implementation of a new Health Related Physical Fitness Program for Winchester Fire EMS. Copies of any SOPs, SOGs or programs would be greatly appreciated.

If I can help you or your department in any way, please feel free to contact me at the following address:

Cathy Rigney
Winchester Fire-EMS
44 N. Maple St.
Winchester, KY 40391

Thanks for all of you help.
Take care of our own and stay safe.

Appendix D

Ashland Fire Dept.

Bourbon County Fire Dept.

Bowling Green Fire Dept.

Burlington Fire Dept.

Central Campbell Fire Dept.

Florence Fire & EMS

Covington Fire Dept.

Edgewood Fire & EMS

Elizabethtown Fire Dept.

Erlanger Fire-EMS Dept.

Fern Creek Fire Dept.

Fort Campbell Fire Dept.

Fort Mitchell Fire Dept.

Frankfort Fire-EMS

Franklin County Fire Dept.

Georgetown Fire & Rescue

Glasgow Fire Dept.

Harrods Creek Fire Dept.

Hebron Fire Dept.

Henderson Fire Dept.

Independence Fire Dept.

Jeffersontown Fire Dept.

Lexington Fire Dept.

Louisville Fire Dept.

Lyndon Fire Dept.

Mayfield Fire-EMS

Maysville Fire Dept.

Middlesboro Fire-EMS

Middletown Fire Dept.

Montgomery Co. Fire Dept.

Murray Fire Dept.

Neon Fire Dept.

Newport Fire-EMS

Nicholasville Fire Dept.

North Oldham Fire Dept.

Owensboro Fire Dept.

Paris Fire Dept.

Pleasure Ridge Park F.D.

Prestonburg Fire Dept.

Richmond Fire Dept.

Saint Matthews Fire Dept.

Scott County Fire-Rescue

Shelbyville Fire Dept.

Somerset Fire Dept.

South Oldham Fire Dept.

Versailles Fire Dept.

Worthington Fire Dept.

Georgetown-Scott Co. EMS

Jessamine County EMS

Madison County EMS

Appendix E

Cardiovascular: One-mile walk (time in minutes)

	Under 30		Under 40		Over 40	
	Men	**Women**	**Men**	**Women**	**Men**	**Women**
Excellent	12:00 or less	12:30 or less	13:00 or less	13:30 or less	14:00 or less	14:30 or less
Good	12:01-14:30	12:31-15:00	13:01-15:30	13:31-16:00	14:01-16:30	14:31-1700
Average	14:31-17:00	15:01-17:30	15:31-18:00	16:01-18:30	16:31-1900	17:01-19:30
Below Avg.	17:01-18:30	17:31-19:00	18:01-19:30	18:31-20:00	19:01-21:30	19:31-22:00
Poor	18:31 or more	19:01 or more	19:31 or more	20:01 or more	21:31 or more	22:01 or more

Strength: Push-ups (# completed in one minute)

	20-29		30-39		40-49		50-59	
	Men	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**
Excellent	38+	35+	30+	27+	22+	24+	21+	21+
Good	31-37	29 -34	22-29	20-26	17-21	15-23	13-20	11-20
Average	22-30	23 -28	17-21	13-19	13-16	11-14	10-12	7-10
Below Avg.	13-21	11 -22	12-16	8-12	10-12	5-10	7-9	2-6
Poor	12<	10<	11<	7<	9<	4<	6<	1

Strength: Crunches (# completed in one minute)

	20-29		30-39		40-49		50-59	
	Men	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**
Excellent	65+	58+	61+	54+	60+	48+	56+	44+
Good	58-64	49-57	52-60	42-53	48-59	37-47	48-55	36-43
Average	51-57	41-48	44-51	35-41	43-47	33-36	41-47	27-34
Below Avg.	40-50	30-40	36-43	30-34	33-42	30-32	33-40	23-26
Poor	29-39	19-29	28-35	22-29	28-32	24-29	27-32	17-22

Flexibility: Sit & Reach (in inches)

	20-29		30-39		40-49		50-59	
	Men	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**	**Women**
Excellent	19+	21+	17+	19+	15+	18+	13+	17+
Good	16-18	18-20	14-16	16-18	13-14	15-17	11-12	14-16
Average	13-15	15-17	11-13	13-15	10-12	12-14	9-10	11-13
Poor	12<	14<	10<	12<	9<	11<	8<	10<

Appendix F

WINCHESTER FIRE-EMS FITNESS PROGRAM

THE NEED FOR FITNESS IN THE FIRE SERVICE

Physical fitness is critical to maintaining the wellness of our uniformed personnel. Aerobic fitness, muscle endurance and muscle strength, flexibility, and body composition must be incorporated into the overall fire service philosophy of performing safely and effectively. Our department must adopt the behavior of taking care of our own; promoting our firefighters to be healthier than when they started their career at WFEMS

MEDICAL CLEARANCE

Prior to involvement in any exercise regime, personnel must be cleared to participate. Medical examinations shall be given prior to fitness assessments. The department physician will provide written documentation on the firefighter's fit for duty status. Medical examinations will be conducted annually. The medical examination will be valid for one year unless there is a need for another exam. The department physician will review the results of the fitness assessments.

DEDICATED TIME FOR EXERCISE

Dedicated on-duty time for exercise will be provided in order to maintain and improve physical fitness levels. 30 to 60 minutes every shift is recommended. Scheduling of time will be dependent on emergency calls. Administrative staff shall also be provided the opportunity for exercise. The physical fitness and wellness of all personnel will be maintained as a priority. Officers will try to ensure that all personnel have the opportunity for physical fitness training.

EQUIPMENT AND FACILITIES

To efficiently utilize allotted exercise time, adequate equipment for a total and balanced exercise program will be provided. Balanced routines consisting of cardio training, muscular strength, muscular endurance, and flexibility have been proven to produce the best fitness levels. All stations have a treadmill and exercise bike for cardio training. A multi-exercise bench and various free weights are

provided for personnel use. Access to College Park Gym, GRC track, and the Winchester Walking trail are also available.

PHYSICAL ABILITY ASSESSMENTS

All uniformed personnel shall participate in a mandatory, non-punitive, and confidential fitness assessment, following medical clearance. Once the assessment is completed, feedback should include the current level of fitness, the level of improvement since past assessments, a realistic evaluation of his or her physical capacity to safely perform assigned jobs, and a suggestion of an exercise program. All personnel must understand that the goal of this evaluation is solely for personal fitness improvement. No standard has been established other than participation.

The assessment will evaluate cardiovascular, muscular strength/endurance, and flexibility. The assessment will consist of two parts; physical fitness stats and a circuit evaluation. Prior to an assessment, a fitness questionnaire will be answered and signed by the firefighter. A resting blood pressure and heart rate will be obtained. If BP is 160/100 or resting heart rate is over 100, the assessment will be delayed for 15 minutes and vital signs re-checked. If BP or heart rate is still elevated, the assessment will be cancelled until cleared by physician to continue.

Physical Fitness Stats:

- 1 mile walk
- Number of push-ups in 1 minute
- Number of crunches in 1 minute
- Sit and reach flexibility test

Circuit Evaluation

The second part of the evaluation will include a circuit test lasting about 25 minutes consisting of the following events:

- Walking on a treadmill at 1 minute intervals
- Dumbbell curls with a total of 40 lbs.

- Pike pole simulation with 12 lbs.
- Dumbbell carries with a total of 70 lb.
- Lat pull downs with 50 lbs.
- Stair mill machine with a 3-minute duration

Walking on the treadmill will be included between each event. (See attached sheet) A heart rate monitor will be used to record heart rates at different times during the evaluation and the cool down period. The goal is not to exceed your target heart rate at any time during the evaluation. If the maximum heart rate is exceeded during a particular event, it helps identify an area that needs improving.

If at any time during the evaluation personnel experience any of the following signs or symptoms, the evaluation will be stopped.

- Onset of angina or angina like symptoms
- Signs of poor perfusion; pallor, light headedness, confusion, nausea
- Individuals request evaluation to stop
- Physical or verbal manifestations of severe fatigue

Attached is an example of the physical ability questionnaire, fitness stat sheet, and the circuit evaluation sheet.

PHYSICAL ABILITY QUESTIONNAIRE

It is required that all uniformed personnel are medically cleared through medical evaluation within 12 months prior to any physical ability assessment. A copy of the Employee Medical Authorization/Certificate signed by the Department Physician will be attached to this questionnaire. A review of health status will be conducted using the following questions. Completed paperwork will be submitted to Human Resources to be placed in your medical file.

- **Has a Doctor advised you not to participate in physical assertion activities due to a heart condition or other medical condition?**

  YES **NO**

- **Do you have pain in the chest when doing physical assertion activities?**

  YES **NO**

- **In the past month, have you experienced chest pain when <u>not</u> doing a physical assertion activity?**

  YES **NO**

- **Do you lose balance or become dizzy during physical assertion activities?**

  YES **NO**

- **Do you have a bone or joint problem that could be made worse by physical assertion activities?**

  YES **NO**

- **Are you currently taking medications for hypertension or other heart conditions?**

  YES **NO**

  If yes, is the medication a beta-blocker? YES / NO

- **Do you know of any other reason why you should not be able to participate in physical assertion activities?**

  YES **NO**

<u>If you experience chest discomfort, dizziness, nausea, shortness of breath, or feel that you cannot continue, please inform staff immediately.</u>

Signed: _____ **Date: _____**

<u>PHYSICAL FITNESS STATS</u>

Name _____ Date _____

Age _____ Height _____

Weight _____ BMI _____% Fat _____%

Resting Heart Rate _____ Blood Pressure _____

****(HR must be below 100) ***(BP must be below 160/100)*

Strength: Push-ups: _____ completed in 1 minute.

Strength: Crunches: _____ completed in 1 minute.

Flexibility: Sit and Reach: + / - _____ inches from toes.

Cardiovascular: 1 mile walk Time: _____

Results of year:_____

Push Ups - _____ Crunches - _____ Flex - _____ Mile Time - _____

Results of year:_____

Push Ups - _____ Crunches - _____ Flex - _____ Mile Time - _____

CIRCUIT EVALUATION

Target Heart Rate (220-age x 0.85):

Name _____ _____

EXERCISE		**HEART RATE**
Start Vital Signs (BP & HR)	BP:	
	Time:	
Treadmill at 15% incline. Run 1 minute @ 5mph		
Dumbbell Curls - 40 reps. @ 15 lbs. (alternate arms / 20 each side)		
Treadmill at 5% incline. Walk 1 minute @ 3mph		
Pike Pole Simulator - 40 reps. @ 12 lbs. (stand/alt/arms/20each side)		
Treadmill at 5% incline. Walk 1 minute @ 3mph		
Dumbbell Carry - 20 reps. @ 35lbs. (squat/pick-up/carry 6 ft./squat/release)		
Treadmill at 5% incline. Walk 1 minute @ 3mph		
Lat Pull downs - 25 reps. @ 50 lbs. (close grip/palms towards face)		
Stair mill 3 minutes @ 68 steps/minute (automatic test on stair mill)		
Treadmill at 5% incline, Walk 1 minute @ 3mph		
	Time:	
Recovery @ 1 minute		
Recovery @ 2 minutes		
Recovery @ 3 minutes		
Recovery @ 4 minutes		
Recovery @ 5 minutes		
End Vital Signs (BP & HR)	BP:	